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10/635,945	08/07/2003	Shumin Tian	3040-101	5849

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EXAMINER	
TAYONG, HELENE E	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/635,945	TIAN ET AL.	
	Examiner	Art Unit	
	HELENE TAYONG	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/2/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 5 and 9 are objected to because of the following informalities: In claims 5 and 9, lines 3-4, change "$\ldots, 0 \le \alpha_1 \le 1$" to - - $\ldots, 0 \le \alpha_M \le 1$ - -; Insert - - wherein M is an integer --. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 5, 6, 7, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jafarkhani et al (US 6823018) in view of Goyal et al (US 6594627).

(1) with regards to claims 1 and 7;

Jafarkhani et al discloses in (figs. 1, 2 and 14) a method for transmitting (fig. 1, 20) and recovering (fig. 1, 40) a signal x (input) , said method comprising the steps of:

generating a plurality N of side descriptions(fig. 2, 21) $\hat{x}_1, \hat{x}_2, \ldots, \hat{x}_N$ of said signal x (fig. 1, 20, col. 4, lines 30-52 and fig. 2, lines 7-26) ;

transmitting (fig. 1, 20) said respective plurality N (fig. 2 and lines 7-26) of side descriptions $\hat{x}_1, \hat{x}_2, \ldots, \hat{x}_N$ over a respective plurality of channels (fig. 1, 201 and 202);

recovering a subset $M(1 \leq M \leq N)$ (fig. 1, 40 and fig. 5) of said respective plurality N of transmitted side descriptions (fig. 2, lines 7-26 and Col. 9, lines 52-65);

and estimating (fig. 5, 47) from said respective subset M of said side descriptions $\hat{x}_1, \hat{x}_2, \ldots\ldots, \hat{x}_M$ using data fusion (figs. 5 ,7 and col. 9, lines 7-31 and col. 11, lines 3-5).

Jafarkhani et al discloses all of the subject matter disclosed above, but for specifically teaching estimating a central description $\hat{x}_0$.

However, Goyal et al in the same endeavor discloses a lattice-structured multiple description vector quantization (LSMDVQ) encoder that generated M descriptions of a signal to be encoded, each of the descriptions being transmittable over a corresponding one of M channels. The encoder is configured based at least in part on a distortion measure which is a function of a central distortion and at least one side distortion. For example, if M = 2, the distortion measure may be an average mean-squared error (AMSE) function of the form f(D0, D1, D2), where D0 is a central distortion resulting from reconstruction based on receipt of both a first and a second description, and D1 and D2 are side distortions resulting from reconstruction using only a first description and a second description, respectively (see abstract and col. 10, lines 38-49).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the method of Goyal et al in the method of Jafarkhani et al in order to estimate a central description $\hat{x}_0$ from said respective subset M of said side descriptions $\hat{x}_1, \hat{x}_2, \ldots\ldots, \hat{x}_M$ using data fusion. The motivation to utilize the method of Goyal

et al in the method of Jafarkhani et al would be to facilitate encoding process and improve performance.

(2) with regards to claims 5 and 9;

Jafarkhani et al discloses wherein said data fusion (fig. 6, 47 and fig. 7) comprises:

Jafarkhani et al discloses all of the subject matter disclosed above, but for specifically teaching estimating said central description $\hat{x}_0$ as a weighted sum $\alpha_1\hat{x}_1+\alpha_2\hat{x}_2+,...,\alpha_M\hat{x}_M$, wherein $0\le\alpha_1\le 1$, $0\le\alpha_2\le 1$, ..., $0\le\alpha_M\le 1$,of said subset M of side descriptions $\hat{x}_1,\hat{x}_2,.....,\hat{x}_M$.

However, Goyal et al in the same endeavor discloses a lattice-structured multiple description vector quantization (LSMDVQ) encoder that generated M descriptions of a signal to be encoded, each of the descriptions being transmittable over a corresponding one of M channels. The encoder is configured based at least in part on a distortion measure which is a function of a central distortion and at least one side distortion. For example, if M = 2, the distortion measure may be an average mean-squared error (AMSE) function of the form f(D0, D1, D2), where D0 is a central distortion resulting from reconstruction based on receipt of both a first and a second description, and D1 and D2 are side distortions resulting from reconstruction using only a first description and a second description, respectively (see abstract and col. 10, lines 38-49).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the method of Goyal et al in the method of Jafarkhani et al in order to estimate said central description $\hat{x}_0$ as a weighted sum $\alpha_1\hat{x}_1+\alpha_2\hat{x}_2+,...,\alpha_M\hat{x}_M$,

wherein $0 \le \alpha_1 \le 1, 0 \le \alpha_2 \le 1, ..., 0 \le \alpha_M \le 1$, of said subset M of side descriptions $\hat{x}_1, \hat{x}_2, ..., \hat{x}_M$. The motivation to utilize the method of Goyal et al in the method of Jafarkhani et al would be to facilitate encoding process and improve performance.

(3) with regards to claims 6 and 10;

Jafarkhani et al further discloses a computer-readable medium such as disk or memory (fig. 3, 300-303) having instructions stored thereon for causing a processor to perform the method of claim 1 (col. 6, lines 18-41).

4. Claims 2,3, 4,8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jafarkhani et al (US 6823018) in view of Goyal et al (US 6594627) as applied in claims 1 and 7 above, and further in view of Orchard et al (US 6920177).

(1) with regards to claims 2 and 8;

Jafarkhani et al discloses wherein said step of generating a plurality N of side descriptions $\hat{x}_1, \hat{x}_2, ..., \hat{x}_N$ of said signal (fig. 1, 20 and fig. 2) comprises:

passing said signal x (fig. 1, input and fig. 2, A, B) through a transformation function (figs. 1 ,2, 3 , (21)) to generate a respective side description $\hat{x}_1, \hat{x}_2, ..., \hat{x}_N$ (col. 6, lines 15-41).

Jafarkhani et al as modified by Goyal et al discloses all of the subject matter disclosed above but for specifically teaching different transformation function $F_1, F_2, ..., F_N$.

However, Orchard et al in the same field of endeavor Multiple Description Coding in (figure 4 and col. 7, lines 6-25) discloses MDTC coder used to implement the EMDC

encoder. In (fig. 4, 405, 425, 405') DCT are disclosed which perform DCT and out DCT coefficients.

It would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the DCT disclosed in the encoder of Orchard et al in the encoder of Jafarkhani et al as modified by Goyal et al to pass the said signal x through a respective different transformation function $F_1, F_2, ..., F_N$ to generate a respective side description $\hat{x}_1, \hat{x}_2, ..., \hat{x}_N$. The motivation to utilize the DCT disclosed in the encoder of Orchard et al in the encoder of Jafarkhani et al as modified by Goyal et al would be to improve the quality of the reconstructions (col. 2, lines 2-3).

(2) with regards to claim 4;

Jafarkhani et al discloses wherein said step of recovering (fig. 1, 40 and fig. 5) a subset $M (1 \le M \le N)$ of said respective plurality N of transmitted side descriptions (Col. 9, lines 52-65); comprises:

passing each said respective subset M of said side descriptions $\hat{x}_1, \hat{x}_2, ..., \hat{x}_M$ through a respective inverse transformation function (fig. 1, 40, 46 and fig. 6, 46).

Jafarkhani et al as modified by Goyal et al discloses all of the subject matter disclosed above but for specifically teaching transformation function $F_1, F_2, \ldots, F_M$.

However, Orchard et al in the same field of endeavor Multiple Description Coding in (figure 4 and col. 7, lines 6-25) discloses MDTC coder used to implement the EMDC encoder. In (fig. 4, 405, 425, 405') DCT are disclosed which perform DCT and out DCT coefficients.

It would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the DCT disclosed in the encoder of Orchard et al in the encoder of Jafarkhani et al as modified by Goyal et al to perform multiple description coding in order to transform $F_1, F_2, \ldots, F_M$ respective subset M of said side descriptions $\hat{x}_1, \hat{x}_2, \ldots\ldots, \hat{x}_M$. The motivation to utilize the DCT disclosed in the encoder of Orchard et al in the encoder of Jafarkhani et al as modified by Goyal et al would be to improve the quality of the reconstructions (col. 2, lines 2-3).

(3) with regards to claim 3;

Jafarkhani et al further discloses quantizing (fig. 1, 22 and fig. 2, 2, 22 and 23) said respective side descriptions $\hat{x}_1, \hat{x}_2, \ldots\ldots, \hat{x}_N$ to a predetermined bit length (col. 5, lines7-67 and col. 6, lines 1-14).

4. Claims 11, 12,13 ,14, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jafarkhani et al (US 6823018) in view of Orchard et al (US 6920177).

(1) with regards to claims 11,14 and 15;

Jafarkhani et al discloses in (figs. 1, 2 and 14) a method of encoding a signal x into N side descriptions (fig. 1, 20 and fig. 2, 21), wherein from two or more of said N side descriptions (fig. 2) said signal x can be estimated (fig. 5, 47 and fig. 7), said method comprising the steps of:

transforming said signal x with a first transformation function F_1 to generate a first side description $\hat{x}_1$ (fig. 2 and fig. 5) ;

for side descriptions 2 to N , transforming said signal x with respective transformation functions (fig. 2).

Jafarkhani et al discloses all of the subject matter disclosed above but for specifically teaching transformation function F_2 to F_N to generate respective side descriptions $\hat{x}_2$ to $\hat{x}_N$; wherein said N transformation functions F_1 to F_N are not all the same.

However, Orchard et al in the same field of endeavor Multiple Description Coding in (figure 4 and col. 7, lines 6-25) discloses MDTC coder used to implement the EMDC encoder. In (fig. 4, 405, 425, 405') DCT are disclosed which perform DCT and out DCT coefficients.

It would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the DCT disclosed in the encoder of Orchard et al in the encoder of Jafarkhani et al to perform multiple description coding in order to generate respective side descriptions $\hat{x}_2$ to $\hat{x}_N$; wherein said N transformation functions F_1 to

F_N are not all the same. The motivation to utilize the DCT disclosed in the encoder of Orchard et al in the encoder of Jafarkhani et al would be to improve the quality of the reconstructions (col. 2, lines 2-3).

(3) with regards to claims 12,13 and 16;

Jafarkhani et al discloses in (figs. 1, 2 and 14) wherein: said step for transforming said signal x with said first transformation function F_1 (fig. 2, 21) to generate said first side description $\hat{x}_1$ comprises encoding said signal x (fig. 2, 206) as a first group of discrete values in a transform domain of F_1x,(fig. 2) wherein said first group of discrete values are specified by a first codebook of a first quantizer (fig. 1, 22 and fig. 2, 22) and a first vector comprising one or more elements of said transform domain F_1x and could be represented by any codeword in said first codebook (col.5, lines 1-6); and

said step for transforming said signal x (fig. 2, 21)

encoding said signal x as a respective second through n^{th} group of discrete values (fig, 2, 206)

wherein said respective second through n^{th} group of discrete values are specified by a respective second through n^{th} codebook of a respective second through n^{th} quantizer (fig. 2, 22 and 23)

Jafarkhani et al discloses all of the subject matter disclosed above but for specifically teaching transformation function F_2 to F_N to generate respective side descriptions $\hat{x}_2$ to $\hat{x}_N$; wherein said N transformation functions F_1 to F_N are not all the same.

However, Orchard et al in the same field of endeavor Multiple Description Coding in (figure 4 and col. 7, lines 6-25) discloses MDTC coder used to implement the EMDC encoder. In (fig. 4, 405, 425, 405') DCT are disclosed which perform DCT and out DCT coefficients.

It would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the DCT disclosed in the encoder of Orchard et al in the encoder of Jafarkhani et al to perform multiple description coding in order to generate respective side descriptions $\hat{x}_2$ to $\hat{x}_N$; wherein said N transformation functions F_1 to F_N are not all the same. The motivation to utilize the DCT disclosed in the encoder of Orchard et al in the encoder of Jafarkhani et al would be to improve the quality of the reconstructions (col. 2, lines 2-3).

4. Claim 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jafarkhani et al (US 6823018) in view of Orchard et al (US 6920177) as applied in claim 16 above, and further in view of Goyal et al (US 6594627).

(1) with regards to claims 17, 20, 21 and 22;

Jafarkhani et al discloses first through N^{th} quantizers (fig. 2, 22-23).

Jafarkhani et al discloses all of the subject matter disclosed above but for specifically teaching

(a) first through N^{th} group of discrete values in said respective transform domains of F_1x to F_Nx.

(b) perturbing said respective first through N^{th} group of discrete values in said respective transform domains of F_1x to F_Nx of respective quantized transformed descriptions x_{IQ} through x_{NQ}, with respective perturbed values that are in said respective first through Nth codebook of said respective first through N^{th} quantizers;

determining whether or not an objective function is reduced by said perturbation; and

replacing said first through N^{th} group of discrete values in said respective transform domains of F_1x to F_Nx of respective quantized transformed descriptions x_{IQ} through x_{NQ} with said respective perturbed values if said objective function is reduced.

(i) with regards to item (a) above;

However, Orchard et al in the same field of endeavor Multiple Description Coding in (figure 4 and col. 7, lines 6-25) discloses MDTC coder used to implement the EMDC encoder. In (fig. 4, 405, 425, 405') DCT are disclosed which perform DCT and out DCT coefficients.

It would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the DCT disclosed in the encoder of Orchard et al in the encoder of Jafarkhani et al to perform multiple description coding in order to generate respective side descriptions $\hat{x}_2$ to $\hat{x}_N$; wherein said N transformation functions F_1 to

F_N are not all the same. The motivation to utilize the DCT disclosed in the encoder of Orchard et al in the encoder of Jafarkhani et al would be to improve the quality of the reconstructions (col. 2, lines 2-3).

(ii) with regards to item (b) above;

Jafarkhani et al as modified by Orchard et al discloses all of the subject matter disclosed above but for specifically teaching perturbing said respective first through N^{th} group of discrete values in said respective transform domains of F_1x to F_N x of respective quantized transformed descriptions x_{IQ} through x_{NQ}, with respective perturbed values that are in said respective first through Nth codebook of said respective first through N^{th} quantizers;

determining whether or not an objective function is reduced by said perturbation; and

replacing said first through N^{th} group of discrete values in said respective transform domains of F_1x to F_N x of respective quantized transformed descriptions x_{IQ} through x_{NQ} with said respective perturbed values if said objective function is reduced.

However, Goyal et al in the same endeavor discloses a lattice-structured multiple description vector quantization (LSMDVQ) encoder that generated M descriptions of a signal to be encoded, each of the descriptions being transmittable over a corresponding one of M channels. The encoder is configured based at least in part on a distortion measure which is a function of a central distortion and at least one side distortion. For

example, if M = 2, the distortion measure may be an average mean-squared error (AMSE) function of the form f(D0, D1, D2), where D0 is a central distortion resulting from reconstruction based on receipt of both a first and a second description, and D1 and D2 are side distortions resulting from reconstruction using only a first description and a second description, respectively (see abstract and col. 10, lines 38-49).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the method of Goyal et al in the method of Jafarkhani et al as modified by Orchard et al in order to perturbing said respective first through N^{th} group of discrete values in said respective transform domains of F_1x to F_Nx of respective quantized transformed descriptions x_{IQ} through x_{NQ}, with respective perturbed values that are in said respective first through Nth codebook of said respective first through N^{th} quantizers; determining whether or not an objective function is reduced by said perturbation; and replacing said first through N^{th} group of discrete values in said respective transform domains of F_1x to F_Nx of respective quantized transformed descriptions x_{IQ} through x_{NQ} with said respective perturbed values if said objective function is reduced. The motivation to utilize the method of Goyal et al in the method of Jafarkhani et al as modified by Orchard et al would be to facilitate encoding process and improve performance.

(2) with regards to claims 18, 21 and 23;

Jafarkhani et al further discloses a computer-readable medium such as disk or memory (fig. 3, 300-303) having instructions stored thereon for causing a processor to

perform the method of claim 12 (col. 6, lines 18-41).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Jafarkhaani et al (US 6324218) discloses multiple description trellis coded quantization.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HELENE TAYONG whose telephone number is (571)270-1675. The examiner can normally be reached on Monday-Friday 8:00 am to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Liu Shuwang can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Helene Tayong

2/29/08

Shuwang Liu

SHUWANG LIU
SUPERVISORY PATENT EXAMINER